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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,180	09/26/2003	Jeffrey G. Cheng	00100.03.0032	9865

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EXAMINER	
GUYTON, PHILIP A	
ART UNIT	**PAPER NUMBER**
2113	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/672,180	CHENG ET AL.	
	Examiner	Art Unit	
	Philip Guyton	2113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-7,9-15,17-19 and 21-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14,15,17,18,19,21,22,23* is/are allowed.

6)☒ Claim(s) *1,2,5-7,10-13,24-26,28-30 and 32-34* is/are rejected.

7)☒ Claim(s) *4,9,27 and 31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20060330*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 5-7, 10, 11, 24, 25, 26, 28-30, and 32-34 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,742,139 to Forsman et al. (hereinafter Forsman).

As per claim 1, Forsman discloses a circuit for monitoring and resetting a co-processor comprising:

a hang detector module operative to detect a hang in the co-processor (column 4, lines 25-27) by detecting a discrepancy between a current state of the co-processor and a current activity of the co-processor (column 4, lines 9-12, lines 25-35); and

a selective processor reset module operative to selectively reset the co-processor without resetting a processor, in response to detecting a hang in the co-processor (column 4, lines 27-35).

As per claim 2, Forsman discloses wherein an operating system executes on the processor (column 4, lines 4-5).

As per claim 5, Forsman discloses:

a halt communications module operative to halt command communications with the co-processor, in response to detecting a hang in the co-processor (column 5, lines 10-15);

a reset check module operative to detect if the co-processor has been successfully reset, in response to the resetting of the co-processor (column 5, lines 28-33); and

a restart communications module operative to restart command communications with the co-processor, in response to detecting that the co-processor has been successfully reset (column 5, lines 33-35).

As per claim 6, Forsman discloses a method of monitoring and resetting a co-processor comprising:

detecting a hang in the co-processor (column 4, lines 25-27) by detecting a discrepancy between a current state of the co-processor and a current activity of the co-processor (column 4, lines 9-12, lines 25-35); and;

selectively resetting the co-processor without resetting a processor, in response to detecting a hang in the co-processor (column 4, lines 27-35).

As per claim 7, Forsman discloses wherein an operating system executes on the processor (column 4, lines 4-5).

As per claim 10, Forsman discloses:

halting command communications with the co-processor, in response to detecting a hang in the co-processor (column 5, lines 10-15);

detecting if the co-processor has been successfully reset, in response to the resetting of the co-processor(column 5, lines 28-33); and

restarting command communications with the co-processor, in response to detecting that the co-processor has been successfully reset (column 5, lines 33-35).

As per claim 11, Forsman discloses a circuit for monitoring and resetting a co-processor comprising:

a hang detector module operative to detect a hang in the co-processor (column 4 lines 25-27);

a halt communications module operative to halt command communications with the co-processor, in response to detecting a hang in the co-processor (column 5, lines 10-15);

a selective processor reset module operative to selectively reset the co-processor without resetting a processor, in response to detecting a hang in the co-processor (column 4, lines 27-35);

a reset check module operative to detect if the co-processor has been successfully reset, in response to the resetting of the co-processor (column 5, lines 28-33); and

a restart communications module operative to restart command communications with the co-processor, in response to detecting that the co-processor has been successfully reset (column 5, lines 33-35).

As per claim 24, Forsman discloses a memory containing instructions executable on a processor that causes the processor to:

detect a hang in a co-processor (column 4, lines 25-27) by detecting a discrepancy between a current state of the co-processor and a current activity of the co-processor (column 4, lines 9-12, lines 25-35); and

selectively reset the co-processor without resetting the processor, in response to detecting a hang in the co-processor (column 4, lines 27-35).

As per claim 25, Forsman discloses instructions that causes the processor to detect if the co-processor has been successfully reset, in response to the resetting of the co-processor (column 5, lines 28-33).

As per claim 26, Forsman discloses a circuit for monitoring and resetting a co-processor comprising:

a hang detector module operative to detect a hang in the co-processor (column 4, lines 25-27) by detecting a discrepancy between a current state of the co-processor and data in one or more storage elements associated with the co-processor, wherein the data in the one or more storage elements represents a current activity of the co-processor (column 4, lines 9-12, lines 25-45); and

a selective processor reset module operative to selectively reset the co-processor without resetting a processor, in response to detecting a hang in the co-processor (column 4, lines 27-35).

As per claim 28, Forsman discloses wherein the hang detector module is operative to determine if the data in the one or more storage elements reflects processing of instructions by the co-processor (column 4, lines 36-45).

As per claim 29, Forsman discloses wherein the current state of the co-processor is represented by data stored in the one or more storage elements associated with the co-processor (column 4, lines 36-45).

As per claim 30, Forsman discloses a method of monitoring and resetting a co-processor comprising:

detecting a hang in the co-processor (column 4, lines 25-27) by detecting a discrepancy between a current state of the co-processor and data in one or more storage elements associated with the co-processor, wherein the data in the one or more storage elements represents a current activity of the co-processor (column 4, lines 9-12, lines 25-45); and

selectively resetting the co-processor without resetting a processor, in response to detecting a hang in the co-processor (column 4, lines 27-35).

As per claim 32, Forsman discloses determining if the data in the one or more storage elements reflects processing of instructions by the co-processor (column 4, lines 36-45).

As per claim 33, Forsman discloses wherein the current state of the co-processor is represented by data stored in the one or more storage elements associated with the co-processor (column 4, lines 36-45).

As per claim 34, Forsman discloses a memory containing instructions executable on a processor that causes the processor to:

detect a hang in a co-processor (column 4, lines 25-27) by detecting a discrepancy between a current state of the co-processor and data in one or more

storage elements associated with the co-processor, wherein the data in the one or more storage elements represents a current activity of the co-processor (column 4, lines 9-12, lines 25-45); and

selectively reset the co-processor without resetting the processor, in response to detecting a hang in the co-processor (column 4, lines 27-35).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forsman in view of U.S. Patent App. No. 2002/0093505 to Hill et al. (hereinafter Hill).

As per claim 12, Forsman does not disclose expressly wherein the processor is a host processor and the co-processor is a graphics processor.

Hill discloses a system in which a graphics processor works with the main CPU to execute graphic-intensive software (paragraph 21 - graphics processor referred to as "graphic accelerator"). Hill's system prevents the entire computing system from crashing due to a failure specific to the graphics accelerator, by performing a series of tests (paragraph 23, lines 1-16). If the graphics accelerator does not perform adequately, the software graphics processor will take over instead of crashing the system (paragraph

34, last 4 lines, paragraph 35). Hill discloses that he intends to improve situations where a reset due to a graphics processor crash is unacceptable (paragraph 19, last 8 lines). Forsman also wishes to recover a system of multiple processors without performing a full system reset (Forsman - column 1, lines 25-29). Using a graphics processor in place of a service processor in Forsman's system would prevent system crashes due to graphics accelerators as well as the service processor, preventing crashes due to incompatible video accelerators or other faults. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the graphics accelerator monitoring system of Hill into the processor reset system of Forsman, providing additional protection against hardware failure.

As per claim 13, Forsman discloses wherein the hang detector module detects the hang in the graphics processor by detecting a discrepancy between a current state of the graphics processor and a current activity of the graphics processor (column 4, lines 9-12, lines 25-35).

Response to Arguments

5. Applicant's arguments filed 11 April 2007 with regard to claims 1-2, 5-7, 10-11, and 24-25 have been fully considered but they are not persuasive.

With regard to claims 1, 6, and 24, applicant argues that Forsman does not disclose a system that detects a discrepancy between a current state of the co-processor and a current activity of the co-processor. More specifically, applicant contends that the heartbeat signal is not capable of indicating a discrepancy and the

rejection improperly conflates the claimed "current state" limitation and the "current activity" limitation into a single limitation. The examiner respectfully disagrees.

The cited portions of Forsman disclose a system in which a host processor and a service processor exchange heartbeat signals (column 4, lines 9-12). The heartbeat signals indicate that a service processor is active and working correctly (column 1, lines 35-37). When the host fails to detect a heartbeat signal, it is a discrepancy between the current state (i.e.: active and working correctly) and the current activity (no heartbeat signal). To correct this discrepancy, the host attempts to reset the service processor and return it to its original state where it can continue to process heartbeat signals.

Applicant argues that the heartbeat signal is not capable of indicating a discrepancy. More particularly, applicant states that the heartbeat signal is capable of indicating only one of two things: functioning or not functioning, and appears to reason that the claims require more than these two states. However, this is an improperly imposed limitation, as the claims only require detection of a discrepancy. In Forsman, a heartbeat signal indicates no discrepancy, and no heartbeat signal indicates a discrepancy. There is no requirement in the claims that the current state and the current activity are detected. Thus, Forsman discloses each and every limitation of the claims.

With regard to claim 11, applicant argues that Forsman does not disclose a halt communications module operative to halt command communications with the co-processor, in response to detecting a hang in the co-processor. The examiner respectfully disagrees. The cited portion of Forsman (column 5, lines 10-15) describes

the reset of the service processor, which includes determining whether there are conditions that preempt the host from resetting the service processor in step 302 (figure 3). Next, the host waits for a predetermined timeout period for the service processor to respond to the reset signal (column 5, lines 16-22).

Applicant asserts that the disclosure of waiting a predetermined timeout period for the service processor to respond to a reset warning signal does not teach halting of command communications with the co-processor, and in fact teaches the opposite, in which communication appears to be open. However, this is an incorrect interpretation of the claims. Halting of command communications does not indicate that communication lines are closed. Halting of command communications simply means that no communications occur. As stated by applicant, Forsman requires that the host listens during a prescribed period for a suitable service processor response, which means that no communications occur for this period of time. Thus, Forsman teaches halting command communications with the co-processor, as recited in claim 11.

6. Applicant's arguments, filed 11 April 2007, with respect to claims 4, 9, 27, and 31 have been fully considered and are persuasive.

Allowable Subject Matter

7. Claims 14, 15, 17, 18, 19, 21, 22, and 23 are considered allowable.

8. Claims 4, 9, 27, and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Guyton whose telephone number is (571) 272-3807. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on (571) 272-3645. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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5/25/07